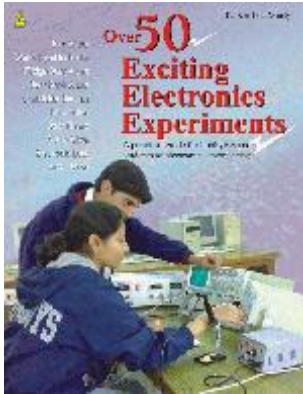




## Over 50 Exciting Electronics Experiments



**Author:** K.krishna Murty  
**Format:** Paperback  
**ISBN:** 8122310095  
**Code:** 6679A  
**Pages:** 164  
**Price:** Rs. 150.00 US\$ 6.00

**Publisher:** Pustak Mahal  
Usually ships within 15 days

Electronics are here to stay! Be it hospitals, grocery stores, railway stations, or your own house, electronics are everywhere. With electronics intruding each and every sphere of life, more and more people are taking up this field both as a hobby and a career. The only way to understand electronics is to follow Confucius, that is, conducting experiments on your own and seeing for yourself.

Over 50 Exciting Electronics Experiments is specially designed to make it possible. The book will take you on a guided journey through this exciting world of electronics. Your travel will begin with the basic building blocks, the power supplies, eventually leading to simple solder less projects with piezo buzzer. Then you will pass through the lanes of digital ICs, building alarms for home, automobile and telephone and mains control.

In the audio street, you shall come across simple lapel mike to 20 W (RMS) Amplifier and the process of recording voice on a chip. Towards the end, counters and clocks will introduce themselves to you.

Throughout the journey, pin outs, truth tables and descriptions on ICs will be your constant companions. Notes on Tips and Tricks, Soldering and Desoldering, Care of ICs, CMOS and TTL ICs, and Troubleshooting will guide you through this trip and make it an enjoyable experience for you.

So, what are you waiting for? Grab this book and start your tour to the fascinating world of electronics!

### ABOUT THE AUTHOR

K. Krishna Murty is the author of Spice in Science, another book published by Pustak Mahal. It is an unusual book replete with interesting anecdotes, memorable events and little known facts from the lives of great scientists.

A mechanical engineer by profession, he has a passion for electronics. His expedition in this field began 35 years ago with the good old AC125 germanium transistors, and ever since he has been pursuing electronics as a hobby. Many of his articles and projects in electronics have been published in Electronics For You. He also has a large collection of science anecdotes, many of which are published in the national science magazine, Science Reporter, in its columns Scientifically Yours!, Fun with Scientists, Lighter Side, etc. His writings have also found way in the columns of Indian Express as Wonderful Bites. Telugu magazines like Andhra Bhoomi and Navya have also published his articles.

Turning Rightly the Scientific Temperament, Never Say Die, Rejected, But Not Dejected, Birth of an Idea, Is a Scientist hidden in you?, Crackles crackled up in Science! are some of his enlightening talks broadcast by All India Radio, Visakhapatnam. Presently, he is a consultant with Dr Reddy's Labs.

### CONTENTS:

Power Supplies  
Half Wave Power Supply



Full Wave Power Supply  
Regulated Power Supplies  
Buzzers  
Water High Level Alarm  
Water Low Level Alarm  
Fire Alarm  
IC 555  
Basic Oscillator (Tone Generator) At 1.8 KHz  
Water High Level Alarm  
Light Alarm (Sun Up Alarm)  
Burglar Alarm for Car Stereos  
Light Dependent Staircase Switch  
Car Battery Low Indicator  
Digital ICs  
Fridge Door Alarm  
Refrigerator Defrost Timer  
Pseudo Random Lights  
Water Level Indicator  
Advertisement Display  
30-minute Kitchen Timer  
Touch Switch With CD4066  
Turn Signal Indicator  
Staircase Switch with CD4013  
Light Sensitive Staircase Switch with Triac  
Door Knob Alarm  
Simple Quiz Circuit with SCR  
Four Station Quiz  
Electronic Lock  
Stitching Machine Motor Speed Control  
Telephone Light  
Morning Alarm for Babies  
White Led Night Light  
Chandelier Dimmer  
Audio Circuits  
A Collar Mike  
Preamplifier with LA3161  
LM386 Audio Amplifier  
Door Phone  
LA4555 Audio Amplifier  
Full Duplex Intercom with KA6283  
Audio Power for Computer Applications  
Simple Radio with CA810  
10W Audio Amplifier  
20W Amplifier  
Audio Mixer  
Mike Mixer Level Display / Stereo Display  
LB1405 Display  
Recording Voice On IC  
Counters  
Single Digit Counter / Live Mains Indicator  
Bet a Number Game  
Object Counter or Visitor Counter  
Digital Clock  
More Main Circuits  
High Low Voltage Cut Off  
Super Simple Twilight Switch  
Notes  
Tips and Tricks  
Soldering  
Desoldering  
ICs and Care in Handling



CMOS ICs  
TTL ICs  
Problems and Solutions

## PREFACE

Wonder if the trio Shockley, Bardeen and Brattain ever imagined that their invention of a tiny transistor on that fateful day on December 23, 1947 would transform the twentieth century! Have Jack Kilby or Robert Noyce ever thought that their four transistor integrated circuits would one day evolve into chips containing a few million transistors? And Gordon Moore?

As the world is shrinking, boundaries are broken; electronics is smiling from behind in this technological revolution! A single product that managed to alter the course of human history in a short span of time, the transistor! Hobby in electronics is exciting and its experiments are exhilarating. Electronics is a field which grows continuously with ever expanding frontiers. But...

Students still wade through a curriculum that laps theory a lot. Practical experience of even a diode evades them. An enthusiastic hobbyist often had to rely on the evasive knowledge of repair mechanics or so called service engineers who learnt their knowledge at the cost of the customers.

In this context, here is a book that abounds with a number of enjoyable electronics projects for upcoming hobbyist and a practical student.

I hear, and I forget.  
I see, and I remember.  
I do, and I understand.

This old adage generally attributed to Confucius, the Chinese sage, sums up hobby in Electronics.

And to do and understand, here now you are on a guided tour of this interesting hobby.

The engine for this tour should have the power. Hence the travel begins with basic building blocks, the power supplies, leading to simple solder less projects with piezo buzzer.

The next stop is at the irresistible, versatile and very rugged IC, 555 which provides the effortless feel of proper project building.

Then the drive goes through to digital ICs, building alarms for home, automobile and telephone and mains control.

Start with a simple lapel mike in the audio street and go ahead in paces to 20 W(RMS) AMPLIFIER and then to VOICE RECORDING ON CHIP.

Counters and Clock are around but in the end.

In this journey you have constant travel companions with pin outs, truth tables and descriptions of the ICs. Electronic components introduce themselves as they appear with little notes, details and discussion, rather than sit pretty in the pantry car. Unnecessary textual theory which dissuades a normal hobbyist is avoided. As these details are at the project site and not jumbled at a different place, botheration of leafing through the pages back and forth is avoided.

The book begins with simple circuits, goes on to complex circuits. More experienced persons are prompted to skip to the next stop. The trip is practical and useful. No fancy circuits. No obsolete devices. Parts lists are enclosed with the projects. Generally available (even in towns) components are used.

Notes on TIPS AND TRICKS, ART OF SOLDERING AND DESOLDERING, CARE OF ICs, CMOS AND TTL ICs, TROUBLE SHOOTING, etc., is the guard of the train, of course stays at the end.

Details which are available elsewhere are carefully avoided, but at the same time the book is self sustaining and you have practical hints and trouble shooting techniques.

There are two indices, one page wise and the other section wise.

Your driver has over 35 years of practical experience whose expedition in electronics hobby started with good old AC125 germanium transistor. But experience does not preclude mistakes. Welcome!



The journey begins!  
AN EXCERPT FROM THE BOOK  
Power Supplies

Most of the present day electronic circuits work on low voltage direct current, whereas the domestic power available in India is high voltage alternating current at 230V. To work on our hobby circuits and general electronic devices, we need to step down this 230V AC to 3, 6, 9, or 12 volts or any other required voltage, and rectify to make it direct current.

A transformer is used to step down the high voltage AC to low voltage AC. Transformer is device with a large number of turns of insulated copper wires wound on iron core, known as Primary side and is connected to AC 230V. A less number of turns are wound over this to give lower voltage, which is known as secondary side. This is known as a step down transformer. Transformers are rated at voltages and current they can deliver. Transformer has an added advantage of isolation, which protects us from shock. After transformation the voltage is still alternating. Hence we have to rectify it to make it direct current for which, we have semiconductor diodes coming in handy.

There are two methods for this rectification process -half wave and full wave. Simple rectification does not yield pure DC; it has still the AC ripple on it. Capacitors filter this out and then we get a reasonably good DC.

Half wave rectifiers have more of this ripple over them and their voltage regulation is poor. Full wave rectifier has better line regulation and has less AC ripple on it because both the half cycles are rectified. But do not underestimate half wave power supply. It is just adequate for many applications and is extensively used. However both these power supplies suffer from the drawback that their voltage drops appreciably as the current drawn from it is increased. These power supplies also fluctuate as the mains power supply fluctuates. When you need to maintain strict stabilized voltage, we have regulated power supplies which keep up constant voltage irrespective of line and load fluctuations.

Here we discuss power supplies from simple half wave rectifier to adjustable regulated ones. Please note that any one of the power supply circuits shown herein are used to power up the later circuits depending on the line, load and circuit requirements. Hence it is good to know a little about them and it is important to build a good power supply. The power supply is the basic building block for our hobby and a beginning is to be made here. On the other hand we have not discussed the latest switch mode power supplies as some parts like high frequency transformers are not easily available for a general hobbyist. In general projects with winding of coils are avoided in this book for the same reason.

Before we go into the actual circuits, let us build a power supply and improve on it. If you are well versed with power supplies and have actually built them, go ahead and skip this section. There are a lot of interesting circuits ahead.

This hobby will be more and more exciting as we dive deeper and deeper into it.

## About Pustakmahal Publishers

**Pustak Mahal** publishes an extensive range of books that are both affordable and high-quality.